CONTRACT NAS5-32605
EOSDIS IV&V

INTEGRATED SUPPORT ENVIRONMENT (ISE) INFRASTRUCTURE METRICS REPORT for August

(Deliverable 0417)

September 12, 1996

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1. INTRODUCTION

1.1. Identification of Document

This is the Infrastructure Metrics report for the Integrated Support Environment (ISE). The ISE is being established under the Infrastructure and Tool Development task order (Task 4C) of the Earth Observing System Data and Information System (EOSDIS) Independent Verification and Validation (IV&V) contract. The ISE provides the tools and infrastructure necessary for the performance of the EOSDIS IV&V and the EOS Ground System (EGS) Integration and Test (I&T) effort. Work associated with the EOSDIS IV&V and EGS I&T efforts is being performed in both Greenbelt, MD and Fairmont, WV.

1.2. Purpose and Scope of Document

The purpose of this document is to provide ISE infrastructure measurements for

- hardware resources,
- server up/down time,
- homepage utilization,
- client/server tool repositories, and
- tool usage information.

1.3. Document Status and Schedule

This ISE Infrastructure Metrics Report, dated 12 September 1996, includes the infrastructure metrics for the month of August 1996. This report is delivered monthly to report the metrics for the prior month.

2. Hardware Resource Metrics

The ISE system architecture reflects a networked heterogeneous environment incorporating several COTS products and a few developed or customized applications. The documented architecture depicts an environment which is flexible and supportive for incrementally adding tools as new needs and requirements are levied against the ISE. Exhibit 2.1-1 reflects the network/computational infrastructure of the ISE.

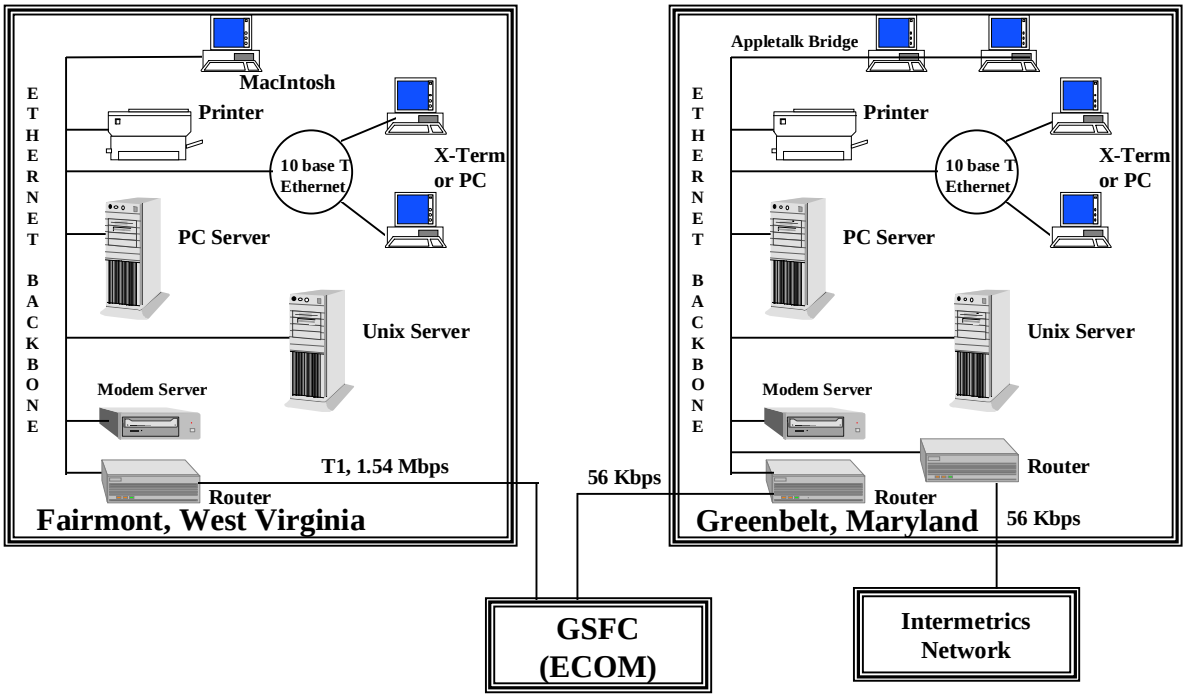


Exhibit 2.1-1 Network/Computational Infrastructure

In addition to the network/computational infrastructure, a high level understanding of the development infrastructure can be garnered from Exhibit 2.1-2, ISE Development Infrastructure. This exhibit depicts many of the COTS tools which are a part of the ISE as well as the tools necessary to satisfy tool development undertakings.

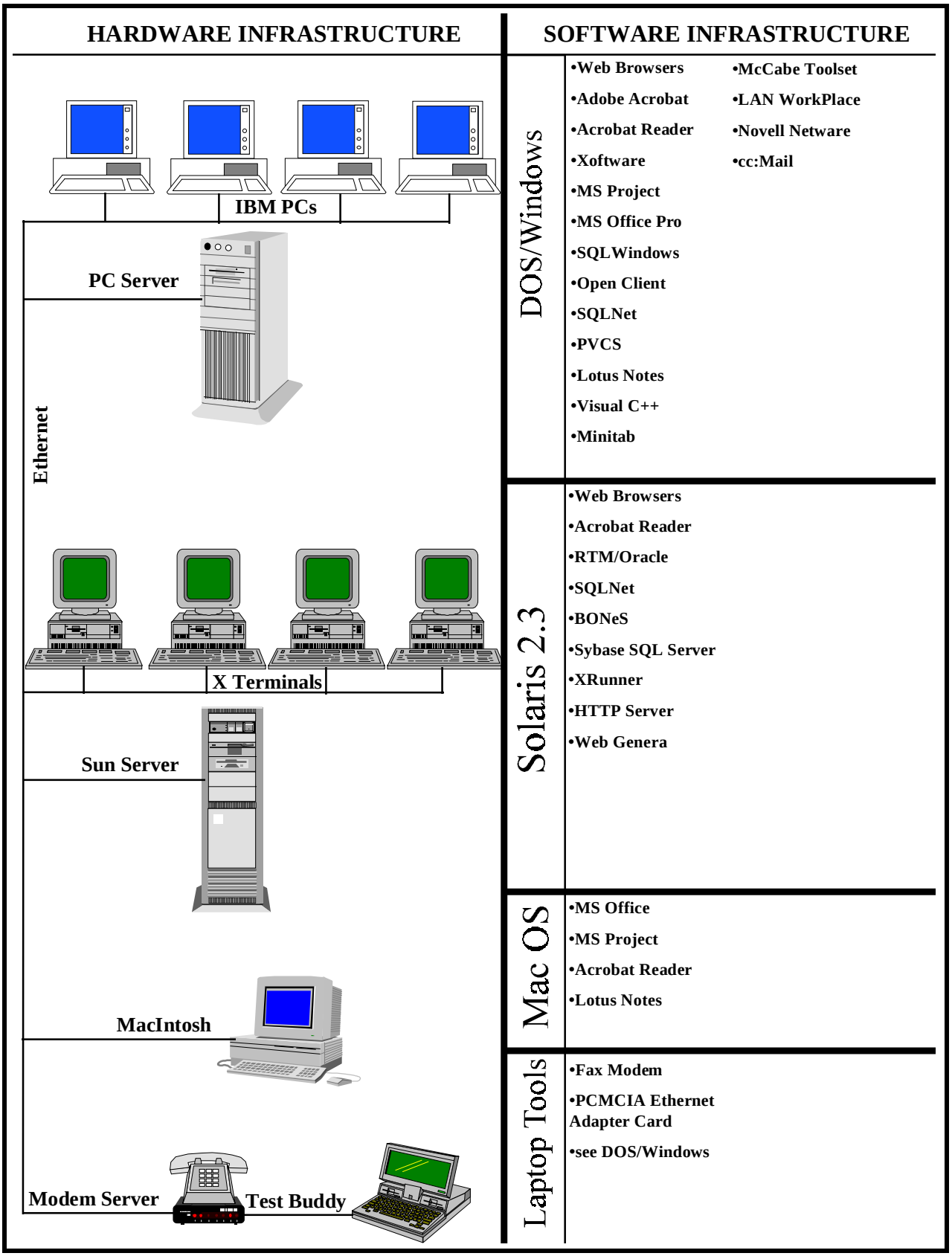


Exhibit 2.1-2 ISE Development Infrastructure

Table 2.1-1 delineates the number of PCs, laptops, MACs, X-Terminals, Suns, and printers which are currently configured and maintained as a part of the EOSDIS IV&V computing infrastructure in Greenbelt, MD and Fairmont, WV.

Facility Location	PCs	Laptops	MACs	X-Terms	Suns	Printers
Greenbelt, MD	42	5	4	8	2	4
Fairmont, WV	11	2	1	3	1	1
TOTALS	**53**	**7**	**5**	**11**	**3**	**5**

Table 2.1-1 Hardware Resource Metrics

3. Server Up/Down Time Metrics

This section reports on the up time, down time, and maintenance time associated with file servers, mail servers, and database servers for Greenbelt, MD and Fairmont, WV.

NOTE: Metrics reported in this section are based upon work week operational hours which include hours from 8:00 a.m. on Monday until 5:00 p.m. on Friday (105 hours per week). For August, there were 4 full weeks (105 * 4 = 420) and the hours from 8:00 a.m. on 1 August through 5:00 pm on 2 August (24 + 17 = 41). All metrics are relative to 461 operational hours for the month of August.

Exhibit 3-1 reflects Netware file server metrics relative to operational hours for the month of August.

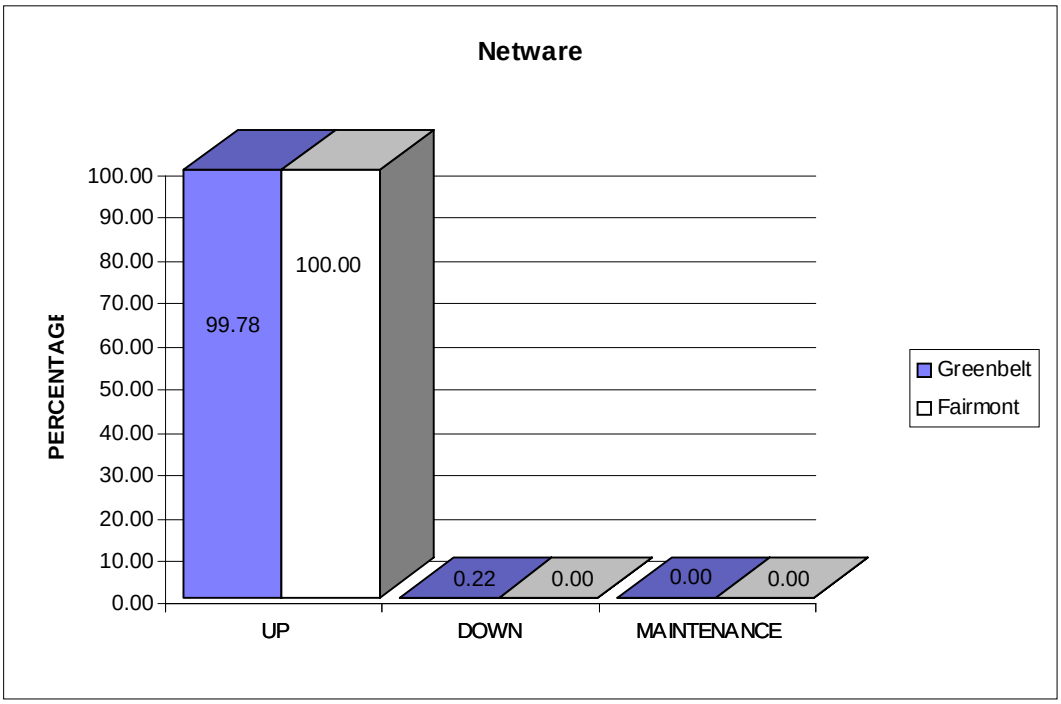


Exhibit 3-1 Netware File Server Operational Metrics

Exhibit 3-2 reflects cc:Mail metrics relative to operational hours for the month of August.

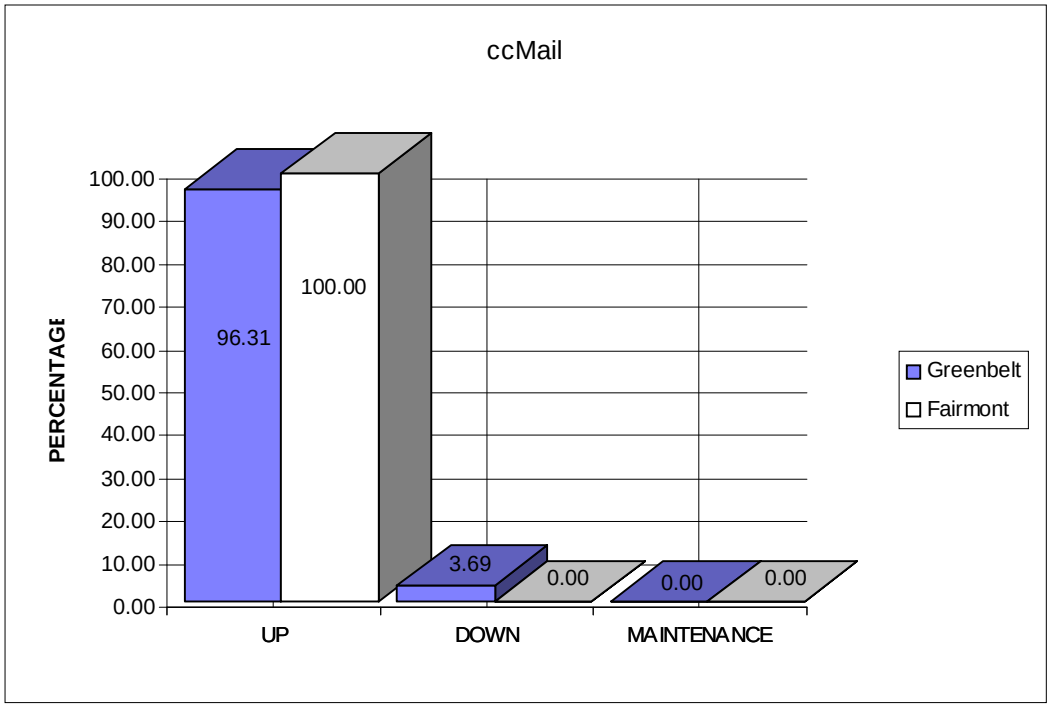


Exhibit 3-2 cc:Mail Operational Metrics

Note: NetWare server downtime also results in loss of mail capabilities during downtime.

Exhibit 3-3 reflects Sybase SQL Server and RTM/Oracle metrics relative to operational hours for the month of August.

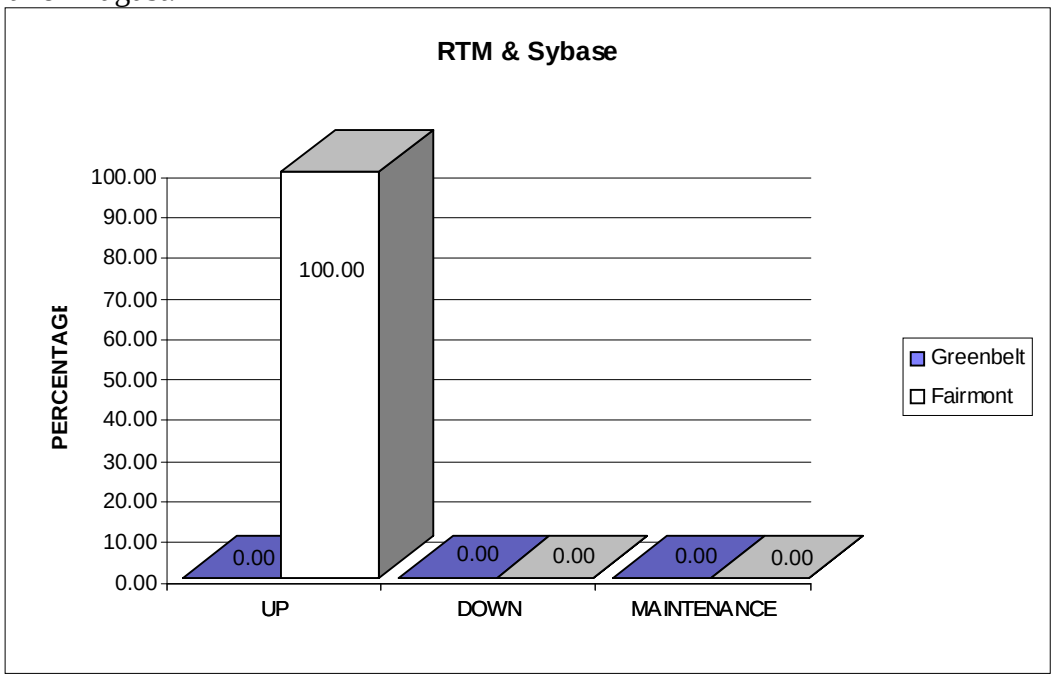


Exhibit 3-3 Sybase and RTM/Oracle Operational Metrics

Information necessary for the production of exhibits within this section were derived from the following logged information.

System/App.	Date(s)	Time	Downtime (Hrs.)	Reason/Comments
Sybase	----------	----------	0	----------
RTM	----------	----------	0	----------
NetWare Server	----------	----------	0	----------
cc:Mail	8/23	6:00pm - 6:30pm	0.5 (Weekend)	General monthly maintenance.

Table 3-1 Fairmont Server Up/Down/Maintenance Log

System/App.	Date(s)	Time	Downtime (Hrs.)	Reason/Comments
NetWare Server	8/16-8/17	4:00pm (Friday) - 6:00pm (Saturday)	1 (Operational) 25 (Weekend)	Installed new server and upgraded to Netware 4.1.
cc:Mail	8/21	7:00am - 8:00am 2:30pm - 3:30pm 6:00pm - 7:00pm	3	Router connection lost. Reestablished connection.
	8/22	7:00am - 8:00am 10:30am -11:30am	2	Router connection lost. Reestablished connection.
	8/23	10:00am -11:00am	1	Router connection lost. Reestablished connection.
	8/26	6:00pm - 7:00pm 9:20pm - 10:20pm	2	Router connection lost. Reestablished connection.
	8/27	6:30am - 7:30am 9:50am - 10:50am 2:30pm - 3:30pm	3	Router connection lost. Reestablished connection.
	8/28	6:45am - 7:45am	1	Router connection lost. Reestablished connection.
	8/29	7:10am - 8:10am	1	Router connection lost. Reestablished connection.
	8/30	9:00am - 10:00am 11:15am - 12:15pm	3	Router connection lost. Reestablished connection.

		4:00pm - 5:00pm		Power saver feature turned off. A program to restart machine when router lost its connection was added. This seems to have solved the problem.

Table 3-2 Greenbelt Server Up/Down/Maintenance Log

Note: NetWare server downtime also results in loss of mail capabilities during downtime.

Exhibit 3-4 reflects cc:Mail metrics relative to operational hours for the months of July and August.

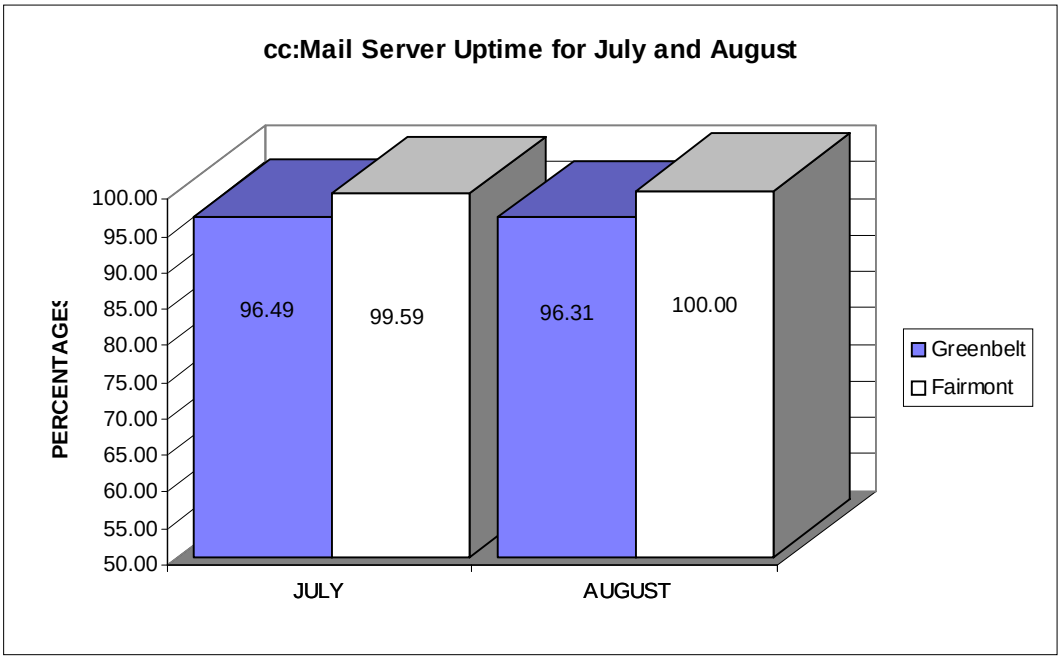


Exhibit 3-4 cc:Mail Server Uptime for July and August

4. Homepage Utilization Metrics

The EOSDIS IV&V Homepage was developed using Hyper Text Markup Language (HTML) and published via a HTTP server which resides on the Fairmont Sun Sparcserver 1000. The original intent of the page was to disseminate EOSDIS IV&V deliverable information via the WWW. The initial EOSDIS IV&V Homepage was deployed for public access in March 1995. Since that time, the majority of EOSDIS IV&V deliverables have been made available via the page and personnel contact information has also been published. The Universal Resource Locator (URL) for the EOSDIS IV&V Homepage is "http://fairmont.ivv.nasa.gov/ivv".

In addition to deliverable information, a Technical Analysis Memorandum (TAM) library has been created to offer sensitive information to GSFC personnel through a WWW browser. This area of the homepage is only available to designated users based on IP address and is accessible through the EOSDIS IV&V Library page.

In June 1996, a PITS World Wide Web (WWW) browser capability was incorporated as a part of the EOSDIS IV&V Homepage. This capability allows GSFC personnel to access PITS data stored in Sybase through a WWW browser such as Netscape. The PITS WWW browser will be expanded to include query and reporting functionality similar to that in the PITS client/server application. This browser also limits access to designated users based on IP address.

The EOS Ground System I&T Homepage was released on 1 November 1995. Several library categories and schedule information has been made available for download. The Universal Resource Locator (URL) for the EGS I&T Homepage is "http://fairmont.ivv.nasa.gov/it".

Table 4-1 contains the access statistics for the various homepages. These metrics are produced by the HTTPD server and updated weekly.

Homepages	**Accesses/Month**		
EOSDIS IV&V Homepage	18,266 (TOTAL)		
Homepage Areas:	IV&V (8226)	[1]TAM (219)	
April 1996	[2]PITS(1252)		
May 1996	1254	18	N/A
June 1996	2174	45	N/A
July 1996	2227	17	500
August 1996	1137	50	428
	1434	89	324

[1] Access to this homepage is controlled by IP address
[2] Access to this homepage is controlled by IP address

EGS I&T Homepage	3,560 (TOTAL)
April 1996	263
May 1996	620
June 1996	331
July 1996	546
August 1996	558

Table 4-1 EOSDIS Homepage Access Metrics

Exhibit 4-1 is a visual representation of the access metrics for the various homepages. A bar chart contrasts the usage statistics by month.

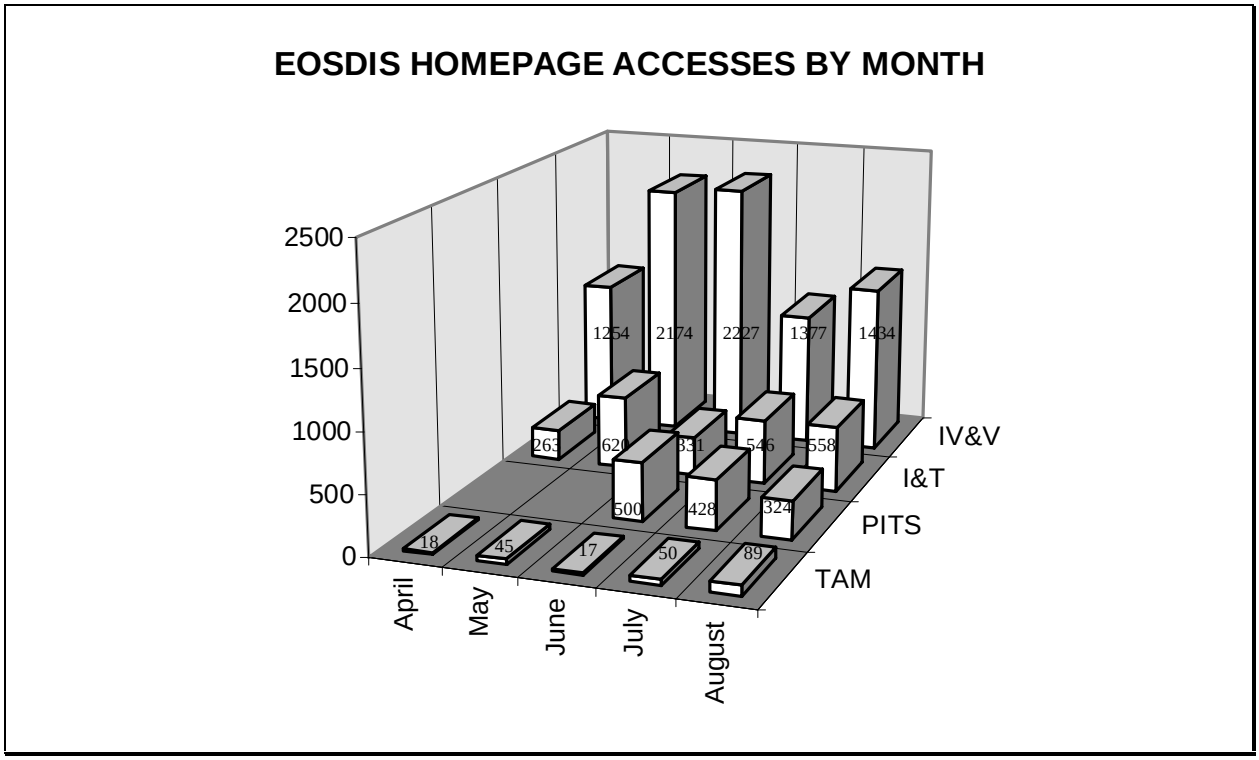


Exhibit 4-1 EOSDIS Homepage Accesses by Month

5. Client/Server Tool Repository Metrics

The client server tools including the Project Issue Tracking System (PITS), Automated Requirement Database (ARDB) and Test Management Database (TMDB) store data in a Sybase SQL Server repository. Table 5-1 highlights some cumulative totals for information maintained in the Sybase SQL Server.

Client/Server Tool	Repository Metrics (Totals)	
Test Management Database (TMDB)	**IR-1**	**Version 1**
Functional Test Threads	46	34
Test Cases	141	118
Automated Requirements Database (ARDB)		
Requirements Analysis Issues	986	
Project Issue Tracking System (PITS)		
EOSDIS IV&V TIMs	151	
ESDIS ICWG TIMs	134	

Table 5-1 Client/Server Tool Repository Metrics

5.1. Project Issue Tracking System (PITS) Metrics

This section delineates several PITS metrics for the EOSDIS IV&V repository. No special metrics were reported for the 127 Interface Control Working Group TIMs. Exhibit 5.1-1 below reflects the number of open, closed, and closed with concern issues in the EOSDIS IV&V repository.

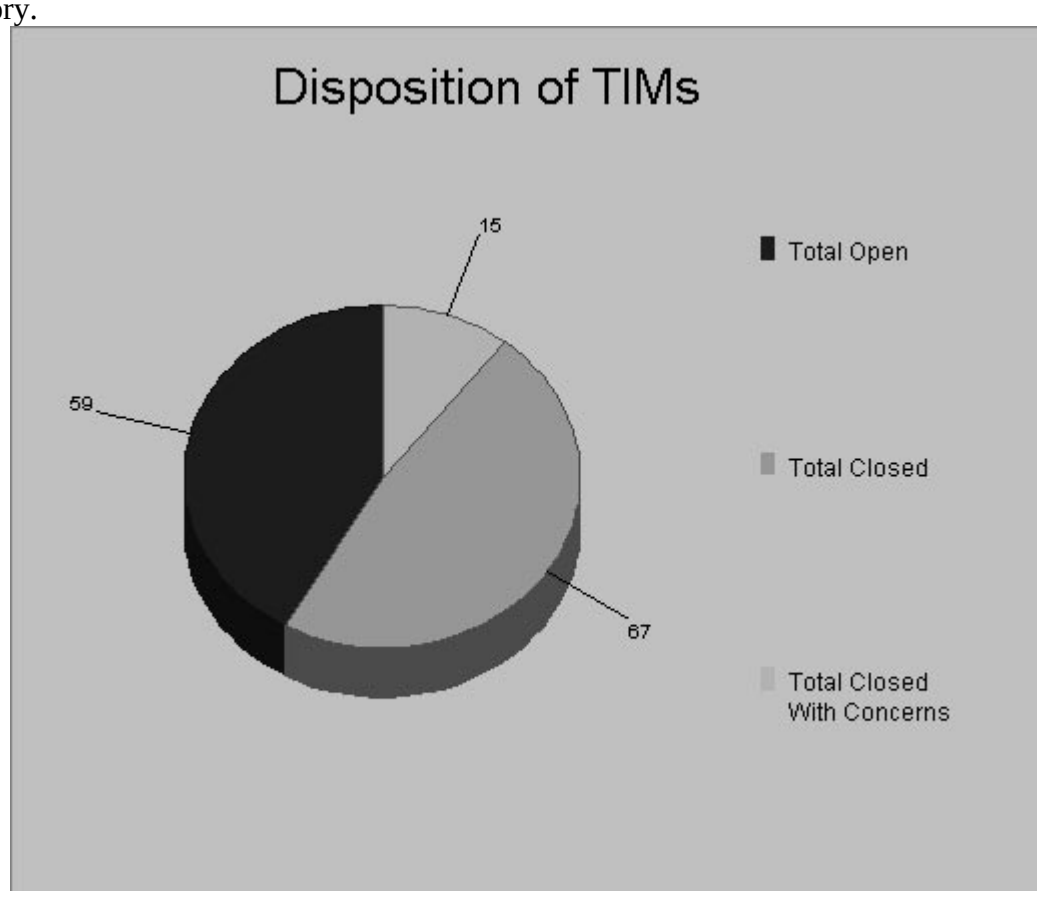
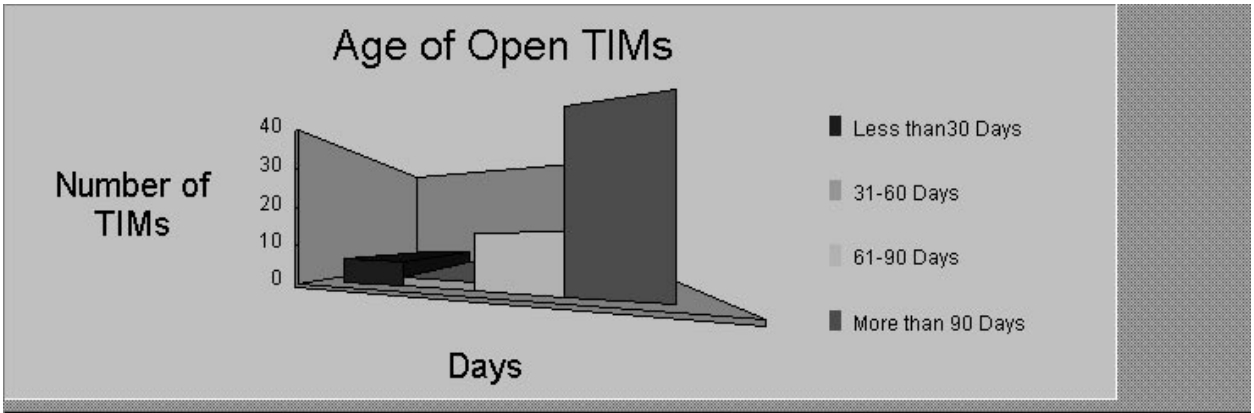


Exhibit 5.1-1 EOSDIS-IVV Repository Issue Status

Exhibit 5.1-2 below provides the number of issues that have remained open for one, two, three, or in excess of three months.



Severity	Criticality	Open 0-30 days	Open 31-60 days	Open 61-90 days	Open 91+ days	Open Total	Closed	Closed with Concerns
Major	Critical	1	0	4	11	16	1	0
Major	Essential	1	0	2	4	7	7	3
Major	Fulfillment	0	0	0	0	0	2	0
Moderate	Critical	1	0	3	13	17	7	4
Moderate	Essential	3	2	2	3	10	30	5
Moderate	Fulfillment	0	0	0	0	0	4	0
Minor	Critical	0	0	0	5	5	2	1
Minor	Essential	0	0	2	2	4	12	2
Minor	Fulfillment	0	0	0	0	0	2	0
Totals:		6	2	13	38	59	67	15

Exhibit 5.1-2 EOSDIS-IVV Repository Aging Report

Table 5.1-1 reflects the issue open/closure information for the past 4 months. Based on the information, an average of approximately 24 TIMs were opened while only approximately 18 TIMs were closed monthly.

Month	Opened	Closed
May	27	16
June	53	36
July	9	4
August	6	15
TOTALS	**95**	**71**

Table 5.1-1 EOSDIS-IVV Repository Monthly Open/Closure Counts

Table 5.1-2 reflects issue counts by "Domain".

Domain	Count
ECS	7
• ECS Release A - 10 • ECS Release A SCDO - 11 • ECS Release A FOS - 2	23
• ECS Release B - 4 • ECS Release B SCDO - 15 • ECS Release B FOS - 0	19
• EGS Test Version - 0 • EGS Test Version 1 - 2 • EGS Test Version 2 - 2	4
EDOS	1
SCFs/Science	3
DAAC	2
TOTAL	**59**

Table 5.1-2 EOSDIS-IVV Repository Issue Domain Metrics

Table 5.1-3 reflects open issues by issue severity and criticality.

Severity / Criticality	Major	Moderate	Minor	Criticality Totals
Critical	16	17	5	**38**
Essential	7	10	4	**21**
Fulfillment	0	0	0	**0**
Severity Totals	**23**	**27**	**9**	**59**

Table 5.1-3 EOSDIS-IVV Repository Issue Severity/Criticality Metrics

Table 5.1-4 reflects open issues by issue category values.

Category	Count
Interfaces (30.51%)	18
Requirements (16.95%)	10
Design (28.81%)	17
Process (15.25%)	9
Integration & Test (3.39%)	2
Implementation (3.39%)	2
Programmatics (1.69%)	1
TOTAL	**59**

Table 5.1-4 EOSDIS-IVV Repository Issue Category Metrics

6. Tool Usage Data

With the exception of the EOSDIS IV&V and EGS I&T homepages (see section 4), the primary users of the ISE has been the EOSDIS IV&V personnel located in Fairmont, WV and Greenbelt, MD. Table 6-1 reflects ISE utilization information associated with both the infrastructure and developed tools.

IV&V Resource	Users (Avg./Month)
Greenbelt LAN (EOSDIS IV&V)	44
Fairmont LAN (EOSDIS IV&V)	11
Project Issue Tracking System (PITS)	25
Automated Requirements Database (ARDB)	4
Test Management Database (TMDB)	13
RTM Difference Utility (RDU)	1
McCabe Toolset	1
Requirement Traceability Management (RTM)	11
Block Oriented Network Simulator (BONeS)	1
XRunner	1
Sybase SQL Server (via ARDB, PITS, & TMDB)	43

Table 6-1 ISE User Metrics

7. Acronyms and Abbreviations

Below is a list of the abbreviations and acronyms used in this document.

ARDB	-	Automated Requirements Database
BONeS	-	Block Oriented Network Simulator
COTS	-	Commercial Off-The-Shelf
ECS	-	EOSDIS Core System
EGS	-	EOS Ground System
EOSDIS	-	Earth Observing System Data Information System
FOS	-	Flight Operations Segment
GSFC	-	Goddard Space Flight Center
GUI	-	Graphic User Interface
HTML	-	Hyper Text Markup Language
ISE	-	Integrated Support Environment
IV&V	-	Independent Verification and Validation
I&T	-	Integration and Test
LAN	-	Local Area Network
MAC	-	Macintosh
MD	-	Maryland
NASA	-	National Aeronautics And Space Administration
PC	-	Personal Computer
PITS	-	Project Issue Tracking System
RAM	-	Random Access Memory
RDBMS	-	Relational Data Base Management System
RDU	-	RTM Differencing Utility
RTM	-	Requirements Traceability Management
SCDO	-	Science and Communications Development Office
TMDB	-	Test Management Database
URL	-	Universal Resource Locator
WAN	-	Wide Area Network
WV	-	West Virginia
WVU	-	West Virginia University
WWW	-	World Wide Web